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**Handbook of Maternal Mortality:  
Addressing the U.S. Maternal Mortality Crisis,  
Looking Beyond Ideology**

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The full text of this publication can be found at: <https://lozierinstitute.org/handbook-of-maternal-mortality-addressing-the-us-maternal-mortality-crisis-looking-beyond-ideology/>

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*Note: An earlier condensed version of this transcript was published in the public record for the September 13-15, 2022 meeting of the Advisory Committee on Infant and Maternal Mortality (ACIMM), available at: <https://www.hrsa.gov/sites/default/files/hrsa/advisory-committees/infant-mortality/acimm-september-2022-minutes.pdf>.*

## Introduction:

After years of failure to obtain accurate statistics on maternal mortality, researchers noted a sharp increase in the United States' maternal mortality with widening racial disparities.<sup>1</sup> Much discussion has followed about possible etiologies of the rise, but the existence of severe deficiencies in data collection and analysis is agreed upon by all.<sup>2</sup> Identification, review, and prevention of maternal mortality remain critical, but elusive, goals despite 70 years of attention and effort.<sup>3</sup>

Additionally, in the wake of the U.S. Supreme Court's recent *Dobbs v. Jackson Women's Health Organization* decision to return induced abortion regulation back to the legislatures, a common narrative has formed that the implementation of legal induced abortion restrictions in many states will worsen the problem of maternal mortality.<sup>4</sup> In order to discover effective strategies to improve the health of women surrounding pregnancy, it is imperative that we follow the science surrounding maternal mortality, even if it leads to uncomfortable conclusions.

As a practicing obstetrician/gynecologist in Texas for 30 years, I hope to convey what the maternal mortality crisis looks like from the perspective of a physician in the trenches. I have seen how this issue affects patients and their caregivers, and for years I have been digging deeper into the issue to uncover details that others may miss. As an advocate for both of my patients, a woman and her unborn child, I have become aware that there is much unreported maternal mortality and morbidity associated with legal induced abortion, often obscured due to the political nature of the issue.

While an observer might assume all maternal mortality occurs due to catastrophic events during childbirth, the reality is that there are many different causes, temporal relationships, and pregnancy outcomes associated with maternal mortality. A collaborative report by 36 states' Maternal Mortality Review Committees (MMRCs) documented that from 2017-2019, 21.6% of pregnancy-related deaths occurred during pregnancy, 13.2% on the day of delivery, 12% in the week following delivery, 23.3% one to six weeks after delivery, and 30% more than six weeks but less than one year after the end of the pregnancy, demonstrating that only 1/4 of pregnancy-related deaths occur due to complications at or shortly after delivery and half occur one week to one year after the end of the pregnancy.<sup>5</sup> Only 66% of maternal deaths are associated with a pregnancy that



progressed to delivery, implicating early pregnancy events in approximately 1/3 of maternal deaths.<sup>6</sup>

I have personally cared for two women who died in proximity to pregnancy, and the reasons were surprising. One died from overwhelming sepsis after a legal, second-trimester prostaglandin infusion abortion. Although I was not involved in her abortion, I assumed her care in the emergency room and held her hand in the ICU, as she pleaded with me not to let her die, with fear in her eyes. The other patient was shot by her boyfriend in a murder-suicide six weeks after I delivered her healthy baby at term. It is likely that neither of these women's deaths came to the attention of the U.S. Centers for Disease Control and Prevention (CDC) or entered U.S. maternal mortality statistics. Like most physicians, at the time I was unaware that unless these women's death certificates specifically documented an association with pregnancy, the CDC was unlikely to become aware of their deaths. As will be discussed in more detail below, the CDC relies heavily on death certificate documentation to alert them to maternal deaths, yet there are many reasons that death certificates may not identify an associated pregnancy.

## DATA DISCUSSION

### Definitions

Data on maternal mortality are compromised by the lack of uniform definitions among organizations responsible for collecting and analyzing maternal mortality data. Deaths are categorized based on their causation and proximity to the end of the pregnancy, often with lack of consistency in these determinations. Additionally, data deficiencies compromise accurate determination of the number of maternal deaths as well as the number of pregnancy events, so any reported U.S. maternal mortality data is widely acknowledged to be inaccurate, as neither the denominator nor the numerator can be known with certainty.<sup>7</sup>

In describing maternal mortality, the broadest category is a **“pregnancy-associated death”**: the death of a woman while pregnant or within 365 days (one year) of the end of pregnancy from any cause. This includes both deaths due to complications of the pregnancy or its management, and deaths due to seemingly unrelated events, such as a car accident, cancer death or homicide, within a year of the pregnancy outcome. When these deaths come to the attention of organizations tasked with data collection and analysis, they are usually analyzed to determine if they should be categorized as pregnancy-related or merely pregnancy-associated. As will be discussed in more detail below, the process of identifying and categorizing such deaths is prone to inconsistencies and data deficiencies, resulting in incomplete or erroneous conclusions.

Upon analysis, a death may be subcategorized as a **“pregnancy-related death”**: the death of a woman while pregnant or within 365 days (one year) of the end of pregnancy,



irrespective of the duration or site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, excluding accidental or incidental causes. An example would include death from sepsis after premature rupture of membranes or cardiac decompensation in a woman with a pre-existing congenital cardiac malformation. This category excludes deaths felt not to be caused by the pregnancy or its sequelae, although there can be subjectivity involved this determination. For example, how do we reliably determine if a mental health related death was caused by or contributed to by the pregnancy? If a woman dies from a pre-existing chronic illness, how do we quantify the effect of the physiologic changes of pregnancy? In the case of a death from cancer, how do we determine whether the pregnancy negatively impacted her treatment or response to treatment? Presumably, epidemiologists and MMRCs investigating these deaths have protocols to assist in these determinations, but unfortunately these protocols are not publicly available.

Pregnancy-related deaths may be “**direct**” – resulting from obstetric complications (as in the first example above), or “**indirect**” – resulting from preexisting disease or disease that developed during pregnancy; not due to direct obstetric causes but aggravated by the physiologic effects of pregnancy (as in the second example).

Pregnancy-related deaths may be further categorized as a “**maternal death**”: the death of a woman while pregnant or within 42 days (six weeks) of the end of her pregnancy, in which pregnancy or its management may have contributed to the cause of death. This could include a new disease caused by the pregnancy such as preeclampsia, ectopic pregnancy or pulmonary embolus, a chronic disease worsened by the physiologic effects of the pregnancy such as worsening of cardiac disease, or hemorrhage due to a surgical mishap during a cesarean section, as long as the death occurred during pregnancy or within six weeks of the end of pregnancy. By definition, “maternal death” excludes deaths caused by injuries from accidents, suicides, and homicides.

A “**late maternal death**” is the death of a woman from direct or indirect obstetric causes more than 42 days (six weeks) but within 365 days (one year) of the end of pregnancy. An example would include a death due to heart failure from postpartum cardiomyopathy two months after delivery or a woman who died after a prolonged course in the ICU resulting from complications at delivery. Intuitively, it is possible that pregnancy complications could contribute to a woman's death even beyond one year, but by convention, such deaths are not documented in maternal mortality statistics.

“**Maternal mortality**” itself has differing definitions depending on the organization and agency. The World Health Organization (WHO) and the CDC's National Vital Statistics System (NVSS) define maternal mortality as a pregnancy-related death occurring **within six weeks** of a pregnancy (maternal deaths only).<sup>8</sup> The CDC's Pregnancy Mortality Surveillance System PMSS defines maternal mortality as a pregnancy-related death occurring until **one year** after the pregnancy ends (maternal deaths plus late maternal



deaths).<sup>9</sup> None of these systems record pregnancy-associated but not pregnancy-related deaths in their data collection. Additional categories include “not pregnancy associated or related” (false positives) or “unable to determine if pregnancy related or associated.”

Different pregnancy outcomes can also be subcategorized. Of particular interest is an “**abortion-related death**”: any death from a direct complication of an induced abortion (legal or illegal), an indirect complication caused by a chain of events initiated by an abortion, or an aggravation of a preexisting medical condition by the physiologic or psychologic effects of abortion without any time limit, reflecting the fact that there is no clear temporal limit on physiological and psychological effects after abortion that may contribute to subsequent death.<sup>10</sup>

### Best practices for identifying maternal deaths

The most comprehensive way to detect all maternal mortality would be to link all death certificates from women of reproductive age with all pregnancy outcomes, to determine the total number of deaths for each pregnancy outcome within a defined time period of a deceased woman's most recent pregnancy. This methodology has been utilized in Scandinavian countries which have single-payer healthcare and meticulous recordkeeping, so that all pregnancy events documented in the health care system are detected and all complications and deaths from those events are known.<sup>11</sup> Once all pregnancy-associated deaths have been detected, then investigation of causality can determine the subset that is pregnancy-related.

Comprehensive records-linkage studies from Finland demonstrate a fact that will implicate the accuracy of the U.S. CDC maternal mortality data drawn primarily from death certificates. In Finland, death certificate documentation alone detects only 26% of deaths after a live birth or stillbirth, 12% of deaths following miscarriage or ectopic pregnancy, and just 1-6% of deaths following induced abortion.<sup>12</sup> Without records-linkage, the association of these deaths with pregnancy would remain unknown. Records-linkage determination of maternal mortality is far superior to death certificate identification.

### Process of maternal mortality determination in the U.S.

In the U.S., the maternal mortality data collection process is initiated by attending physicians, funeral directors, coroners and medical examiners at a local level with completion of maternal death certificates. Some states are divided geographically into local registration districts which collect and then submit data to state agencies, whereas others require submission directly to the state vital statistics office.<sup>13</sup>

These death certificates are then provided by the state vital statistics office to the CDC's National Center for Health Statistics (NCHS) which compiles national data and either manually or through an automated system assigns WHO International Classification of Diseases (ICD) O death codes when a death certificate indicates an associated pregnancy to create a “maternal mortality ratio”, defined as maternal deaths while pregnant or within 42





days postpartum compared to 100,000 live births. It then includes this information in a National Vital Statistics System (NVSS) Report titled, "Deaths: Final Data."<sup>14</sup> This provides annual data which can be compared internationally with other countries utilizing ICD coding based on WHO criteria but is limited for purposes of analysis due to the frequent paucity of data provided on a death certificate.<sup>15</sup>

ICD O death codes include A34 "Obstetric tetanus," 000-095 (direct deaths) and 098-099 (indirect deaths) coding for events occurring during "pregnancy, childbirth and the puerperium," 096 "late maternal deaths," and 097 "death from obstetric cause more than one year after pregnancy." These codes are comprised of different levels of specificity, ranging from very specific such as 011 "preeclampsia superimposed on chronic hypertension" to vague or including a variety of conditions such as 026.8, "other specified pregnancy-related conditions."<sup>16</sup> It should be noted that these codes are usually assigned solely based on death certificate data without a deeper dive into the woman's full medical record, and thus may be prone to error or may be incomplete. For example, a woman may have recently been pregnant and her cause of death was attributed to hemorrhage. Based on that information, the coder may assign "obstetric hemorrhage" when, in fact, she died from a laceration received in an auto accident unrelated to the pregnancy event. Or the opposite can occur. A woman may die in an auto accident following an abortion. The certifier may conclude the two events were unrelated when, in fact, she began to abuse alcohol and became suicidal due to her distress after being coerced into an unwanted abortion, leading to the accident.

Additionally, the CDC receives maternal mortality data from a second source, its National Center for Chronic Disease Prevention and Health Promotion's Pregnancy Mortality Surveillance System (PMSS) which was developed in 1988. The PMSS uses information obtained from death certificates indicating a current pregnancy or pregnancy within the past year or occasionally uses linked maternal death and infant birth or fetal loss (beyond 20 weeks) certificates in order to identify deaths. Epidemiologists then analyze the medical records of the deceased woman to determine pregnancy-relatedness, producing a national "pregnancy-related mortality ratio."<sup>17</sup> This data is more thorough than the NVSS data, but encompasses a different time period (six weeks versus one year after pregnancy), so direct comparisons are difficult to obtain.

Due to the frequent failure of death certifiers to report a concomitant or prior pregnancy within a year, the CDC recommended the addition of a "pregnancy checkbox" to the U.S. Standard Certificate of Death beginning in 2003. The checkbox asked whether a woman was "not pregnant within past year," "pregnant at the time of death," "pregnant within 42 days of death," "pregnant within 43 days to one year before death," or "unknown if pregnancy within past year." This led to an immediate increase in documentation of maternal mortality and apparent increases in maternal deaths. A review comparing over two thousand known maternal deaths documented three times as many maternal deaths





were detected using the checkbox when compared to analyzing death certificates without the checkbox.<sup>18</sup>

Yet inexplicably, much inappropriate use of the checkbox has been documented as well. Studies linking checkbox positive death certificates with hospital records indicate false positive rates as high as 50%, where no documentation of pregnancy was found in the auxiliary records. While it is possible checkboxes were inappropriately marked, consideration needs to be given to the possibility that the death certifier knew of a pregnancy event (induced abortion, miscarriage or birth outside of hospital) that could not be detected through hospital records review alone. Many of the presumed false positive checkboxes were marked in older women, some too old to have any chance of pregnancy. For example, in 2013, 147 deaths in women older than 85 years old had positive pregnancy checkboxes on death certificates. For this reason, the CDC introduced new rules, the “2018 Coding Method”, where they would not allow a pregnancy checkbox alone (without other death certificate documentation of a pregnancy) to be used to indicate a maternal death in a woman older than 45.<sup>19</sup> Little discussion has been given to the question of why and how so many death certifiers inappropriately respond to a straightforward question, impugning the reliability of other information on death certificates as well.

For various reasons, many states delayed the checkbox's implementation on their death certificate forms, so that noncomparable data was obtained for many years, leading the U.S. to be unable to report a maternal mortality rate for international comparison from 2007 to 2018, when all states except California had implemented the recommended checkbox. Even today, California's checkbox asks only if a pregnancy had occurred within a year of death, leaving reviewers unable to separate maternal deaths temporally. California's outright rejection of the CDC's requests has been consistent with their refusal to provide any information to the CDC about abortions performed in their state.<sup>20</sup>

Once pregnancy-related deaths have been identified, in order to develop more detailed recommendations for action, multi-disciplinary Maternal Mortality Review Committees (MMRCs) have convened at local, state, regional and federal levels to comprehensively review reported maternal deaths, utilizing data from multiple sources, including medical records, social records, autopsy reports, and informant interviews. The MMRCs submit their conclusions to state-level Perinatal Quality Collaboratives (PQCs) to support the implementation of their recommendations of best clinical practice in hospitals, which often include additional screening, communication, training, access to care, and management of mental health conditions.<sup>21</sup>

Organizations such as the Alliance for Innovation on Maternal Health, the American College of Obstetricians and Gynecologists (ACOG), and the California Maternal Quality Care Collaborative have developed toolkits to assess risk and provide preventative treatment of hypertensive disorders, hemorrhage, sepsis, and thromboembolism, and these have been enacted in many hospitals.<sup>22</sup> Additionally, the CDC's Levels of Care Assessment



Tool evaluates appropriateness of care depending on resources available in individual hospitals to give guidance on when maternal transfer may be indicated depending on hospital resources.<sup>23</sup> In order to address increasing late maternal mortality, ACOG's Optimizing Postpartum Care Recommendations advise contact with a care team within three weeks postpartum and extending insurance coverage for a full year postpartum, with mental health screening and referrals as appropriate.<sup>24</sup>

The CDC's Division of Reproductive Health has initiated the "Building U.S. Capacity to Review and Prevent Maternal Deaths" initiative to provide tools and training for data review and sharing and development of best practices to assist MMRCs.<sup>25</sup> The Maternal Mortality Review Information Application (MMRIA) has been created as a repository for standardized data generated by these committees, reported as local or state "pregnancy-related mortality ratios."<sup>26</sup> Because relatively few deaths occur in individual states, regional MMRC committees have been able to collate greater amounts of data to produce recommendations for action. Not all states have created MMRCs, however. The CDC has given grant funding to create 39 MMRCs.<sup>27</sup> The MMRCs have been slow to collaborate also. In 2018, nine committees collaborated to publish a report,<sup>28</sup> followed in 2019 by reports from 13 and 14 committees,<sup>29</sup> and most recently, 36 MMRCs published a report.<sup>30</sup> The data from the remaining states remains elusive to the public.

## U.S. data deficiencies

### Unknown numerator of maternal deaths

The CDC relies primarily upon the individual states' vital statistics death certificate documentation (via ICD death codes or pregnancy checkboxes), or deaths that happen to come to its attention from other sources, in order to calculate maternal mortality statistics. The CDC states it also searches for additional deaths through hospital discharge data, media reports and obituary searches, but fails to document how systematically, proactively, and vigorously they seek to discover additional maternal deaths.<sup>31</sup> Concerns about the inadequacy of the CDC's ad hoc system for identifying abortion-related deaths is underscored by the fact that in a given 10-year time span, a single journalist identified 39% more abortion-related deaths from court records and autopsies alone than were identified by CDC.<sup>32</sup>

Differentiating pregnancy-related from pregnancy-associated deaths can be difficult and prone to interpretation or bias. Nationwide, comprehensive protocols for making such determinations are not publicly available, potentially leaving the process susceptible to reviewer preferences or bias. Determining pregnancy relatedness is particularly difficult in the case of mental health or accidental deaths. Even cancer-related deaths can be difficult to determine, as treatment options may have been limited or modified based on pregnancy status, resulting in potentially different outcomes. Likewise, determinations about the effect of pregnancy on chronic health conditions may be difficult to delineate, especially as



time progresses from the end of a pregnancy. In such cases, the MMRC may simply note that it was unable to determine pregnancy-relatedness.<sup>33</sup>

For example, those who believe that mental health complications often follow abortion might conclude that a suicide following an induced abortion is related to that event, whereas those who believe mental health complications cannot be caused by abortion would reject this interpretation.<sup>34</sup> Even regarding term births, researchers often will not consider mental health deaths to be pregnancy-related unless there is clear documentation in the obstetric record that the woman was distressed by her pregnancy.<sup>35</sup>

Texas has been implicated in having a very high MMR, and examination of their 2022 MMRC report is illustrative. One hundred forty-one maternal death certificates from 2019 were brought to the committee's attention. They analyzed only 118 of these deaths and concluded that only 52 (44%) were actually pregnancy-related. The committee was unable to determine pregnancy relatedness for 24 (20%) of the reviewed cases. No discussion was given in the report as to the reasons for the data deficiencies or failure to analyze every potential death.<sup>36</sup>

The numbers of deaths reported by the CDC's two different systems -- National Vital Statistics System (NVSS) and Pregnancy Mortality Surveillance System (PMSS) -- have differed dramatically, partly but not completely, due to different temporal definitions, i.e., six weeks vs. one year. A 2005 article documented that only half of maternal deaths were reported in both systems. For the years 1995-1997, the NVSS reported 898 maternal deaths, because they did not classify a death as maternal if it was coded outside a specific ICD-9 range (630-676), while the more inclusive PMSS reported 1,387 pregnancy-related deaths. The authors concluded that changes in guidelines for coding maternal deaths under ICD-10 might improve data collection. Additional codes became available with implementation of ICD-10 in 2015, resulting in additional deaths being reported, but there is no evidence that this has resulted in better correlation between PMSS and NVSS numbers since that time.<sup>37</sup>

Studies estimate 39-93% of all U.S. maternal deaths are not reported as pregnancy-associated on death certificates, documenting the extreme uncertainty regarding the reliability of this data. The secrecy associated with induced abortion reporting makes it likely that the problem is even worse with abortion-related deaths.<sup>38</sup> While MMRCs have concluded that more thorough data collection could be obtained by linking death certificates of reproductive-aged women with infant birth or death certificates, this is rarely performed. Additionally, the lack of any mandatory documentation of induced or spontaneous pregnancy losses prior to 20 weeks gestation leaves deaths associated with early pregnancy events unobtainable through records-linkage.<sup>39</sup>



*Reasons that maternal deaths may not be documented on death certificates*

1. **Preceding pregnancy not known:** Often, maternal deaths are separated from the end of pregnancy by weeks or even months. Unless the woman is pregnant at the time of death, the death certifier may not have knowledge of any preceding spontaneous or induced abortions. In many cases, even a live birth within the prior year may be unknown.
2. **Initiating pregnancy event known but not documented:** It is recommended that the cause of death section of a death certificate include the immediate cause of death and underlying causes in Part One, and reporting of all other significant diseases, conditions or injuries that may have contributed to death in Part Two.<sup>40</sup> In many deaths due to catastrophic events at delivery, a cascade of events may result in death, but only the most proximate events may be listed on the death certificate. For example: 1. Arrest of dilation in labor > C-section delivery > injury of uterine vessels > hemorrhage > hypotension from blood loss > cerebral vascular event (stroke) from hypoperfusion. 2. Dysfunctions in multiple organ systems may cumulatively lead to death: hemorrhage > disseminated intravascular coagulation (DIC) > acute renal failure; or thromboembolism (clots) > pulmonary embolus > lung failure. 3. Hypoperfusion from hemorrhage could also lead to cardiac damage > cardiac dysfunction > myocardial infarction (heart attack). The same woman could experience all three adverse outcomes noted above after a hemorrhage. With so many events occurring, it is easy to see how the initiating events might be omitted due to space limitations on the death certificate or provider time constraints. It is not unusual for documentation of a maternal death to record the immediate cause of death (for example, embolism, sepsis or hemorrhage) without mention of initiating event (for example, legal induced abortion). Thus, depending on how a death certificate is completed, the cause of death might be listed as “hemorrhage,” when it should more accurately be reported as “legal induced abortion,” without which the hemorrhage would never have occurred. A well-publicized case from New Mexico documents that Keisha Atkins died while undergoing an induction abortion at 24 weeks gestation. She developed a uterine infection and rapidly decompensated. She was taken to the operating room for completion of the abortion where she died. Her death certificate lists her cause of death as “pulmonary embolism due to pregnancy.”<sup>41</sup> Based on this diagnosis, her death would be recorded by the CDC as a pregnancy-related death, not an abortion-related death.
3. **Technologic limitations:** Physicians may have difficulty operating the complex electronic death registries, particularly if they use the systems infrequently or have technologic limitations, which may lead to incomplete documentation. The electronic medical record search engine may fail to discover the limited O-codes that document obstetric death. For example, the Texas “TxEVER” death registration system requires the funeral home to initiate the death record process, then notify



the medical certifier to complete the medical data entry. Due to preset deadlines, often the certifier is given only a short period of time to complete the document and may complete the certificate with incomplete recollection of the events or without access to autopsy results.<sup>42</sup>

4. **Incomplete or unavailable autopsy results:** It should be noted that autopsies are not mandated after a suspected maternal death, nor is there a standardized protocol for performing an autopsy. For example, toxicology testing is often not performed after an accidental or mental health maternal death. These inadequacies may lead to incomplete or erroneous documentation.<sup>43</sup>
5. **Mental health related deaths are often not considered to be pregnancy-related:** Epidemiologists determining pregnancy-relatedness may not consider a mental health related death to be related to the pregnancy outcome, even though the way the pregnancy was resolved may have contributed to the death (such as a stillbirth or coerced abortion leading to suicide). A traumatic pregnancy outcome may worsen or initiate interpersonal or maladaptive behaviors, which can cause diminished mental or physical health, and eventually lead to death. Anxiety and depression related to pregnancy may lead to self-harm and high-risk taking behavior, resulting in deaths from suicide, homicide, fatal accidents, substance abuse and overdoses.<sup>44</sup>
6. **Complete medical records are often unavailable:** State and local MMRCs are provided with maternal death certificates and can usually obtain hospital or obstetric clinic records for review, but records related to early pregnancy events such as a miscarriage occurring outside of a hospital or an induced abortion (often performed in an independent abortion clinic, or with pills obtained outside of the medical system) are usually not available to MMRCs. Since most induced abortions are paid for privately rather than through insurance, one cannot link insurance payment records to detect adverse events related to abortion.<sup>45</sup>
7. **Coding deficiencies related to induced abortion are common:** According to the National Center for Health Statistics, “the number of maternal deaths does not include all deaths occurring to pregnant or recently pregnant women, but only those deaths with the underlying cause of death assigned to International Statistical Classification of Diseases, 10th Revision code numbers A34, 000–095, and 098–099.”<sup>46</sup> A perusal of the WHO ICD-10 coding book documents few codes related to complications or deaths from legal induced abortion: 004=medical abortion, 005=other abortion, 006=unspecified abortion, 007=failed attempted abortion. (Note that the first digit is the letter O and the subsequent digit(s) the number 0.) A code is lacking for surgical abortion, even though most abortion deaths from physical complications occur following surgical abortion, leaving the coder to choose between the imprecise categories of “other” or “unspecified” abortion. Each code can be made more precise by adding numbers after the decimal: 0.0-



0.4=incomplete, that is, the death occurred before the pregnancy tissue was completely removed or 0.5-0.9=complete or unspecified, that is the death occurred after completion of the procedure or timing not known. Specifically, adding 0.5=complete or unspecified abortion complicated by genital tract and pelvic infection, 0.6=complicated by delayed or excessive hemorrhage, 0.7=complicated by embolism, 0.8=with other or unspecified complications, and 0.9=without complication. Strangely, it seems intuitive that an “induced abortion without complication” would not result in a maternal death, which is undoubtedly the worst kind of complication, and this code would be unnecessary. Additional codes related to deaths following cardiac, cerebrovascular, anesthetic, or mental health complications do not exist.<sup>47</sup>

8. **Induced abortion complications may be miscoded as resulting from spontaneous abortion (miscarriage):** If death occurs following an induced abortion, even if a preceding pregnancy is identified, the certifier may mistakenly believe a spontaneous and not induced abortion preceded death. Abortion providers often do not maintain hospital privileges, so when serious complications occur after induced abortion, frightened women often present to an emergency room rather than return to the abortion clinic.<sup>48</sup> Other physicians will then provide emergent care but may be unaware that the pregnancy loss was induced rather than spontaneous if the woman withholds that information, or the physician may be hesitant to ask a woman specifically if she had an abortion. There is also often a failure to distinguish between legal and illegal induced abortion complications as many states have imposed abortion restrictions and illegal chemical abortion pills are being widely promoted in those states. A study of all Medicaid-financed abortions in 17 states documented that in 2015, 61% of women presenting for emergency care for complications following a legal induced chemical abortion and 39% presenting following surgical abortion complications were miscoded as having had a spontaneous abortion. An analysis of the FDA's Adverse Event Reports (AERs) data for chemical abortions revealed that only 40% of surgical procedures for failed chemical abortions were provided by the abortion provider, demonstrating the frequency with which abortion providers are unavailable to care for their patient's complications.<sup>49</sup>
9. **Induced abortion history may be intentionally concealed:** Abortion-related deaths may be concealed (if the abortion is known) by the family to protect the deceased family member and family from anticipated shame.
10. And finally, due to the political nature of abortion, **ideologic commitments may cause the death certifier to omit notation of induced abortion** as the precipitating event. This discussion makes it clear that reported abortion-related mortality data probably represent only the tip of the iceberg.





*Pregnancy-related death may be falsely attributed to mere association*

Once a potential maternal death is identified on a death certificate, either the ICD-10 coding specialists (NVSS) or CDC epidemiologists (PMSS) review the data available on the death certificate to determine if it was “pregnancy-related.” Subjective opinions and ideology may impact this determination, as may paucity of data on the death certificate. There is not publicly available information to determine the criteria a death of despair would need to meet to assign blame to the pregnancy through the PMSS. By definition, the National Vital Statistics System (NVSS) rejects suicide, homicide and accidental deaths as pregnancy-related. Additionally, as noted in the prior discussion on pregnancy checkboxes, a positive checkbox in a woman older than 45 years old is automatically rejected unless additional evidence of pregnancy is also documented on the death certificate.<sup>50</sup> Each of these factors may lead to falsely rejecting a pregnancy-related death from CDC statistics, instead labelling it merely pregnancy-associated.

A 2018 report of nine MMRCs reported that 48.2% of deaths in non-Hispanic Black women were pregnancy-related, whereas it documented only 30.2% in Hispanic women and 28.4% in non-Hispanic white women were pregnancy-related. It has been documented on many occasions that maternal mortality in non-Hispanic Black women is higher than in other racial groups. What if there was an unrecognized bias causing a committee to be more likely to categorize a death in a non-Hispanic Black mother as pregnancy-related, but less likely to do so in other racial groups?<sup>51</sup>

*Unknown denominator of all pregnancy events*

Ideally, the CDC would report a “**maternal mortality rate**” comparing all maternal deaths to the total number of pregnancies, for a true analysis of “at-risk” individuals. It could also compare risks for different pregnancy outcomes by calculating rates specific for childbirth, induced abortion, and natural losses. But in the U.S., these calculations are impossible to perform due to incomplete pregnancy outcome data. The reporting of the numbers of spontaneous pregnancy losses, including miscarriages, ectopic pregnancies, molar pregnancies and stillbirths (together estimated as 15-17% of pregnancies) and intentional losses by induced abortions (estimated as 18-20% of pregnancies) are not mandated and thus unavailable.<sup>52</sup> Fetal death certificates are required only after 20 weeks gestation or if the birth weight is greater than 350 grams, and even then fetuses who die of induced abortions after 20 weeks are excluded from reporting requirements.<sup>53</sup> No serious attempts have been made to document all spontaneous losses or to mandate national legal induced abortion reporting.<sup>54</sup> Even pro-choice medical organizations have documented the deficiencies resulting from the interest only in pregnancy outcomes that occur in the second half of pregnancy.<sup>55</sup> Resistance has followed any recommendations for improving this data collection by mandating reporting of early pregnancy events based on the argument that this would breach a woman’s right to privacy.<sup>56</sup>

Since only the number of live births can be accurately measured due to mandated reporting on birth certificates, the number of live births has become the default





denominator.<sup>57</sup> This data is collected in the CDC's Wide-ranging Online Data for Epidemiologic Research (WONDER) database.<sup>58</sup> Thus, the CDC has chosen to report a "**maternal mortality ratio**," which is defined as the number of maternal deaths per 100,000 live births. Using a maternal mortality ratio instead of a maternal mortality rate introduces inaccuracies because the denominator (live births) is disconnected from the numerator (deaths related to any pregnancy outcome). Only two-thirds of maternal deaths occur in conjunction with a live birth, so many events occur in the numerator (deaths due to ectopic pregnancies, molar pregnancies, miscarriages, stillbirths and induced abortions) that are not represented in the denominator, resulting in an overly inflated maternal mortality ratio.<sup>59</sup>

**Abortion-related deaths** should be calculated based on the number of deaths per 100,000 legal induced abortions. As mentioned earlier, the numerator of abortion-related deaths is unreliable, but this is also true of the denominator. The estimated number of legal induced abortions is voluntarily provided by local and state health departments to the CDC, and independently estimated by abortion providers who report to the Guttmacher Institute, with a large disparity between the two sources. In 2020, the CDC documented 620,327 abortions<sup>60</sup> while the Guttmacher Institute documented 930,160.<sup>61</sup> In 2020, the CDC acknowledged that three of 52 reporting areas (50 states plus District of Columbia and New York City) did not report abortion data at all (California, Maryland, and New Hampshire). Because of this, CDC researchers turn to the Guttmacher Institute's data to calculate the denominator for abortion-related deaths, basing their statistics on a hybrid data collection system. Even the states that do consistently report data do not use standardized forms, so the collected data may differ by state. For example, in 2020, four reporting areas did not report maternal age, 12 did not report marital status, nine did not report the number of previous live births, 10 didn't report the number of previous abortions, 22 did not report race, 11 did not report gestational age, and six did not report on abortion methods.<sup>62</sup> It is documented that women report fewer than half of past abortions in interviews, so health complications related to previous abortions often remain undiscovered.<sup>63</sup> Regarding the numerator, abortion-related deaths should be determined by investigation of all deaths of women with a history of abortion, and should include comprehensive investigation of deaths from suicide, substance abuse, risk-taking, and other self-destructive behaviors. But presently, there is no systematic collection of data regarding abortion-associated deaths as few are noted on maternal death certificates. The CDC's Abortion Surveillance System only identifies and counts deaths which are voluntarily reported or sporadically discovered.<sup>64</sup>

### What does the available U.S. data show?

The most recent data from 36 states' MMRCs, reflecting deaths from 2017-2019, reported that 81.8% of pregnancy related deaths occurred in urban areas, and 18.2% in rural areas. 84% were considered preventable, defined as "a chance it could have been averted with one or more reasonable changes to patient, community, provider, facility and/or systems factors."<sup>65</sup>

In 2019, 14 states' MMRCs, reflecting deaths from 2008-2017, reported that 36% of pregnancy-associated deaths documented by death certificates were pregnancy-related, surprisingly rejecting pregnancy as a contributing factor in nearly 2/3 of deaths occurring in proximity to pregnancy. They determined that 65.8% were preventable. Demonstrating the importance of patient responsibility and familial support, the reviewers determined that 38.2% of deaths might have been prevented if the patient or family's actions had changed, whereas 33.9% might have been prevented if the provider's actions had changed.<sup>66</sup>

Researchers have also documented that about 1/3 of pregnancy-related maternal deaths occurred outside medical facilities.<sup>67</sup> Also, about a third of the pregnancy-related deaths occurred in women who either did not receive any prenatal care or initiated such care late in pregnancy.<sup>68</sup>

Data deficiencies were again identified. Of these deaths, 1.6% had no documentation of timing related to pregnancy, and 1.7% did not have enough information to rule out suicide or homicide as the manner of death. In 1.4% the underlying cause of death could not be determined.<sup>69</sup>

The most recent U.S. maternal mortality statistics from NVSS documented that 861 women died of pregnancy-related causes in 2020 (23.8/100,000 live births) and 754 died in 2019 (20.1/100,000 live births).<sup>70</sup> Only two abortion-related deaths were documented by the CDC in 2019.<sup>71</sup>

### What does the best data show? U.S. comparison to international records-linkage studies

A frequently referenced 2012 study misrepresented the compromised U.S. maternal and abortion-related mortality data, inaccurately reporting legal induced abortion to be 14 times safer than childbirth, by comparing the maternal mortality ratio to the abortion mortality rate. One of the authors, a vocal abortion advocate, previously headed the CDC's Abortion Surveillance Division, and so was aware of the deficiencies in the data. The discrepancies were even acknowledged in the article, which stated, "weaknesses include the likely underreporting of deaths, possibly differential by pregnancy outcome (abortion or childbirth)." In addition to the non-comparable denominators and the reality that an abortion-related death is counted in both numerators, the authors also ignored the disparity in lengths of the pregnancy events: the average induced abortion is performed at eight weeks gestation, whereas the average length of pregnancy resulting in childbirth is 37 weeks gestation, allowing a much longer period for untoward events to occur when a pregnancy is carried to term.<sup>72</sup> A former director of the CDC, Dr. Julie Gerberding, has clarified that maternal mortality ratios and abortion mortality rates "are conceptually different and are used by the CDC for different public health purposes."<sup>73</sup> Additionally,



although the authors reportedly performed a literature review, they ignored many high-quality records-linkage studies demonstrating far more deaths after induced abortion than after childbirth.<sup>74</sup> While this study was meaningless for data-driven science, it provided powerful disinformation to accomplish its purpose for abortion advocacy propaganda.

As mentioned previously, the best method of detecting maternal mortality would be to document “how likely is a woman to remain alive after a pregnancy ends?”, linking all death certificates from women of reproductive age with all documented pregnancy events (usually through a single-payer insurance database), to determine the total number of deaths for each pregnancy outcome within a certain time period of a deceased woman’s most recent pregnancy. Studies that have employed this methodology have documented findings contrary to the common assumption that induced abortion is safer than pregnancy.

### **Studies documenting more deaths following abortion than childbirth**

**California Medicaid.** An eight-year records-linkage study of California Medicaid recipients found that a woman was 162% more likely to die from all causes in the year after an abortion than after childbirth, 182% more likely to die in an accident, and 254% more likely to commit suicide. The death rate two years after childbirth was 112/100,000 pregnancies and after abortion was 228.9/100,000.<sup>75</sup>

**Finland.** High-quality records-linkage studies from Finland revealed that the risk of death in a given year for a non-pregnant woman is 57/100,000 person-years, after term pregnancy is 28.2/100,000 pregnancies, after miscarriage is 51.9/100,000 and after induced abortion rises to 83.1/100,000. The risk of death from any violent cause was six times higher after abortion than childbirth, suicide six times higher, accidental death five times higher, and death by homicide 10 times higher.<sup>76</sup>

**Denmark.** Similar records-linkage studies from Denmark revealed that after a first-trimester induced abortion or miscarriage, a woman had an 244% increased risk of death within 180 days (19/100,000 pregnancies), and a 615% increased risk of death within 180 days for second-/third-trimester abortion (55/100,000) compared to childbirth (7.8/100,000). The death rate within a year after childbirth is 17.9/100,000 pregnancies, after miscarriage is 31.2/100,000, after first-trimester abortion is 33.8/100,000, and after second-/third-trimester abortion is 110/100,000. Additionally, a dose-response was noted, with mortality rates increasing with the more abortions a woman had.<sup>77</sup>

**Meta-Analysis.** Finally, a 2017 meta-analysis of all available records-linkage studies documented that the risk of death is twice as high within six months following abortion than childbirth and remains elevated for many years, with a documented dose-effect, as each additional abortion increased a woman’s risk of dying by 50%. The review documented a curious lack of interest in the issue of maternal mortality and pregnancy



loss, as only eleven of 989 identified studies contained enough information to make a determination related to all types of pregnancy losses.<sup>78</sup>

While it is probable that records-linkage studies will produce many pregnancy-associated deaths that are not necessarily pregnancy-related deaths, wouldn't it be preferable to cast a broad net and have an extensive list of deaths for MMRCs to investigate in order to more completely detect pregnancy-related deaths, than to have a known incomplete system that does not detect all maternal deaths? It is both the starting point for all investigations, but also useful in and of itself, to identify differences in pregnancy-associated mortality that are not easily determined by a forensic examination. For example, unless there are suicide notes or other public expressions, it is difficult to identify all contributing factors to a mental health related death. But statistically strong differences in suicides and accidental deaths after abortion compared to childbirth, such as shown by the Finnish researchers, are certainly very telling. Therefore, pregnancy-associated mortality rates are useful for public health policy and informed consent, even if causality cannot be definitively determined.

## MEDICAL DISCUSSION

### Method of separation impacts maternal mortality risk

When a pregnancy progresses to childbirth, delivery may occur by several methods. Term spontaneous or induced vaginal delivery (SVD) has the lowest risk of maternal death compared to other methods of term deliveries.<sup>79</sup> Operative vaginal delivery, assisted with vacuum or forceps, has a higher risk of complications such as hemorrhage and adjacent tissue damage than an SVD.<sup>80</sup> Cesarean section delivery has much higher risks of maternal death, both because pregnancy complications may necessitate the cesarean section, as well as increased risks of hemorrhage, infection, thrombotic complications, and direct organ damage from this major intraabdominal surgery. Studies indicate maternal mortality from cesarean section may be as much as 100 times higher than vaginal birth.<sup>81</sup> One-third of U.S. births occur by cesarean section, a relatively large percentage compared to many other developed nations, and this may also contribute to the U.S.'s higher maternal mortality ratios.<sup>82</sup>

Preterm deliveries (< 37 weeks gestation) may occur by vaginal delivery, operative vaginal delivery or cesarean section, and are inherently riskier than a term delivery due to complications that lead to early delivery. For example, premature separation of the mother and fetus may be required due to a hypertensive crisis, bleeding emergency or other conditions. Preterm births also have an increased likelihood of cesarean section due to malpresentation, fetal intolerance of labor, failed medically-indicated labor induction or other factors. Medical interventions to delay preterm birth when labor commences early may also increase risks, such as toxicity from magnesium sulfate administration or increased risk of sepsis from expectant management of preterm, premature rupture of membranes.<sup>83</sup>

Early natural losses, also known as spontaneous abortions or miscarriages, may resolve spontaneously without intervention, may require medications such as misoprostol or mifepristone, or may be treated with surgical dilatation and suction aspiration, with or without sharp curettage. Some may require a combination of these procedures. The gestational age at the time of the pregnancy loss impacts risk, as later miscarriages have higher risks of retained tissue leading to excessive hemorrhage or infection.<sup>84</sup>

An ectopic pregnancy is implanted in a location outside of the uterus (or rarely within the cervix or cornual junction between the uterus and tube). Most commonly, it implants in the fallopian tube where continued growth can stretch the tube to the point of rupture, resulting in catastrophic internal bleeding. Once diagnosed, it must be treated surgically or with an injection of methotrexate unless there is clear evidence it is resolving through miscarriage.<sup>85</sup>

Gestational trophoblastic disease, also called hydatidiform mole, is a rare abnormal pregnancy that has the potential for invasion and metastasis of the pregnancy tissue. When diagnosed, it is treated with surgical removal of the abnormal tissue. Close follow-up is required to rule out systemic invasion, which is treated with chemotherapy or additional surgery if it occurs.<sup>86</sup>

Induced abortion is the intentional ending of fetal life within the uterus.<sup>87</sup> The gestational age when the abortion is performed impacts risk, as maternal mortality increases as the gestational age increases. The CDC documents a 38% increase in mortality for each week that an abortion is performed beyond eight weeks, with 14.7-fold increased mortality early in the second trimester, 29.5-fold increase in the mid-second trimester, and 76.6-fold increase in the risk of death to a woman from abortion after viability (second half of pregnancy).<sup>88</sup>

Medical (chemical) abortion is usually performed with mifepristone to withdraw hormonal support for the developing fetus and misoprostol to induce uterine contractions. It has been associated with excessive hemorrhage and atypical infections, accounting for at least 28 reported maternal deaths in the U.S.<sup>89</sup> It is also associated with pharmacologically induced anxiety and depression in the animal model.<sup>90</sup> Complications occur four times as often as with surgical abortions. Surgical completion due to retained pregnancy tissue is required in approximately three to eight percent of first-trimester procedures. Abortion initiated medically but completed surgically compounds these risks.<sup>91</sup> Data regarding chemical abortion complications are often unobtainable, especially since abortion advocates have begun advising women to withhold disclosure of a previous chemical abortion if they should happen to seek emergency care for abortion-related complications.<sup>92</sup>



In 2021, the FDA removed the in-person dispensing requirement from mifepristone's Risk Evaluation and Mitigation Strategy (REMS) safeguards, allowing chemical abortion pill distribution outside of medical supervision through online ordering and mail-order delivery.<sup>93</sup> On January 3, 2023, the FDA officially modified the REMS and related materials, detailing how brick-and-mortar pharmacies are also now permitted to dispense chemical abortion drugs after submitting a pharmacy agreement form.<sup>94</sup> These unsupervised chemical abortions are being increasingly promoted to women, especially in states with abortion restrictions. However, failed abortion from underestimation of gestational age (resulting in more tissue to be expelled and often requiring surgery), missed diagnosis of ectopic pregnancy due to failure to perform ultrasound (these medications do not treat an ectopic), and missed opportunity for RhoGAM immunoprophylaxis (if not given, may cause the mother to produce an immune response against the fetus in future pregnancies) are all events that can increase the risk of maternal mortality in current or future pregnancies.<sup>95</sup>

Later chemical abortions, performed after the first trimester, are usually induced by oral or vaginal prostaglandins (misoprostol), or mifepristone and misoprostol, but may require surgical suction or sharp curettage for retained pregnancy tissue in up to 39% of women.<sup>96</sup> Feticide (injecting medications to stop the fetal heart) is often performed prior to induction, but this may lead to maternal cardiac complications if digoxin or potassium chloride enters a woman's bloodstream;<sup>97</sup> and if feticide is not performed, a live birth may occur and the abortionist may perform active or passive infanticide.<sup>98</sup> Intraamniotic instillation procedures such as saline infusion, prostaglandin infusion or urea infusion are rarely performed due to deaths from electrolyte imbalances, infections and hemorrhage.<sup>99</sup>

Surgical abortions require opening the cervix by osmotic dilatation, prostaglandin dilatation or mechanical dilatation or a combination of the above. Cervical damage or creation of a false passage during dilatation and/or perforation of the uterus during surgical curettage may lead to catastrophic hemorrhage or infection requiring emergency surgical intervention or to complications in a subsequent pregnancy.<sup>100</sup> First-trimester dilatation and suction aspiration may occur with or without sharp curettage (D&C), and sharp curettage has been linked to uterine damage. Second-/third-trimester dilatation and evacuation/extraction (D&E) may deliver the fetus intact ("partial-birth" abortion) or non-intact ("dismemberment" abortion), although an intact D&E is illegal by federal and many state laws. A non-intact D&E requires many blind passes of surgical instruments into the uterus, which can also lead to damage of the uterus or retained tissue.<sup>101</sup> Hysterotomy (cesarean section) or hysterectomy abortions, though rarely performed, are associated with high maternal mortality.<sup>102</sup> Later surgical abortions are associated with increased complications from uterine perforation or adjacent organ damage due to the relaxed uterine musculature, which may increase the risk of sepsis, hemorrhage, and thrombosis.<sup>103</sup> After 18 weeks gestation, the mortality rate from induced abortion (7.4 deaths/100,000) is more than twice that for vaginal childbirth (3.6 deaths/100,000).<sup>104</sup>





### Direct causes of maternal deaths

The triad of infection, hemorrhage, and hypertensive disorders of pregnancy, which in the past accounted for >90% of all pregnancy-related deaths, now accounts for only about one-third of these deaths. New causes of death have emerged, and currently about half of pregnancy-related deaths involve cardiovascular, cerebrovascular, and other medical conditions.<sup>105</sup> “Deaths of despair” from mental health disorders are also increasingly common causes of maternal deaths.<sup>106</sup>

**Cardiovascular conditions** are the most common physiologic category identified by MMRCs as causing maternal mortality, accounting for 12.8% (2017-2019)<sup>107</sup> to 13.8% (2008-2017)<sup>108</sup> of pregnancy-related deaths. This number excludes deaths from cardiomyopathy and preeclampsia, which will be discussed below.<sup>109</sup> Many women who had complex cardiac repairs as infants due to congenital anomalies have now lived to reproductive age. While their repaired anatomy is sufficiently functional to allow them to mature to adulthood, it may decompensate when dramatic vascular changes occur during pregnancy.<sup>110</sup> Additionally, the poor preconceptual health of many American women -- advanced age, obesity, diabetes, hypertension -- may predispose them to cardiovascular disease.

Poor preconceptual health may also predispose women to extreme and difficult-to-control blood pressure fluctuations which can lead to seizures, strokes, liver rupture and other catastrophic complications. Deaths due to accelerated hypertension from preeclampsia or eclampsia occur most commonly at delivery or within a week of delivery, accounting for an additional 6.5% (2008-2017) to 8.3% (2017-2019) of deaths.

Cardiomyopathy, accounting for an additional 8.5% (2017-2019) to 9.3% (2008-2017) of deaths, a pregnancy-related inflammation of the heart, is relatively rare, but has a 10% mortality rate and is the most common cause of late maternal death. Although maternal mortality is measured (at most) until a year after the end of a pregnancy, it should be noted that a history of abortion or miscarriage is associated with an increased risk of cardiovascular disease in subsequent pregnancies<sup>111</sup> and an increased risk of death from cardiovascular disease over many years.<sup>112</sup>

**Hemorrhage** accounts for 13.1% (2008-2017) to 13.7% (2017-2019) of deaths.<sup>113</sup> This most commonly occurs due to atony-failure of the uterus to contract sufficiently to shut off the massive blood flow through the enlarged uterus. Safety toolkits and hemorrhage drills are utilized in most hospital systems, but sometimes, even in the best equipped and prepared hospitals, death may be unavoidable.

One increasingly common cause of hemorrhagic maternal death is an abnormally invasive placenta. “Placenta accreta spectrum disorder” occurs in 1:272 pregnancies and is associated with uterine damage from prior uterine surgery (cesarean section, myomectomy or sharp curettage for miscarriage or induced abortion). Catastrophic





bleeding due to inability to separate the placenta from the uterus may require many blood products that can overwhelm a hospital's blood supply. If diagnosed before birth, these women should be electively delivered in a tertiary medical center with a specialized multidisciplinary program and the ability to perform mass transfusion protocols. Often a hysterectomy is required.<sup>114</sup> Placental abruption has also been associated with faulty placental attachment due to prior uterine damage and is also linked to excessive blood loss and poor maternal and neonatal outcomes.<sup>115</sup>

Early in pregnancy, a ruptured ectopic pregnancy can also lead to catastrophic internal bleeding and death. Undiagnosed ectopic pregnancies that rupture in women undergoing unsupervised chemical abortions are 30% more likely to result in death than if the woman had not sought an abortion, because she may interpret the pain and bleeding as a sign the medication is working rather than a sign her life is in danger.<sup>116</sup>

**Infection** accounts for 9.2% (2017-2019) to 11.4% (2008-2017) of deaths,<sup>117</sup> but early diagnosis and treatment of sepsis have also been well addressed with safety toolkits in most hospital systems, increased awareness and use of broad-spectrum antibiotics.

Maternal death due to sepsis may be associated with expectant management of extremely early premature rupture of membranes to optimize fetal outcomes. Cervical incompetence (painless dilation), associated with risk of extreme premature delivery, may be increased with prior cervical or uterine instrumentation (conization for dysplasia, or dilatation and curettage for spontaneous or induced abortion). We have poor ability to predict or prevent preterm delivery, which occur in 10% of U.S. deliveries, but it should be noted that there is a dose-dependent increase in premature delivery after prior induced abortions. Large meta-analyses have demonstrated 25-35% increase in preterm birth after one induced abortion, and 32-72% increase after more than one.<sup>118</sup>

**Embolism** describes an occlusion of vascular flow with potentially deadly consequences, accounting for 8.7% (2017-2019) to 9.5% (2008-2017) of deaths.<sup>119</sup> A woman may form an accentuated clotting response due to physiologic changes in pregnancy or complications from pregnancy management (venous thromboembolism), leading to obstructed vessels in the lungs (pulmonary embolus) or brain (cerebrovascular accident). Air or amniotic fluid can also enter the circulation and lead to a vascular obstruction. Fortunately, these events are rare but are often deadly. Embolisms may occur spontaneously during labor but are also associated with vascular complications from surgical abortions or cesarean sections when instruments have lacerated vessels and introduced foreign matter.<sup>120</sup>

**Mental health** conditions have been determined to be causative in 8.8% (2008-2017) to 22.7% (2017-2019) of maternal deaths,<sup>121</sup> even though researchers often do not attribute mental health



conditions to the woman's death, labeling them "pregnancy-associated" rather than "pregnancy-related" deaths. While there are many ways in which an adverse pregnancy outcome could affect a woman's mental health, there is a high likelihood that these deaths are often missed and unaccounted for in U.S. maternal mortality statistics. No standardized protocols exist for determination of whether a mental health condition contributed to a woman's death, so researchers may use subjective criteria to determine causality.<sup>122</sup>

**Anesthetic reactions, complications or overdose** are rare, accounting for < 2% of maternal deaths.<sup>123</sup>

Demonstrating the difficulty in accurately determining causes of death, approximately 7.5% of maternal deaths have **undetermined causes**.<sup>124</sup>

### Indirect causes of maternal deaths

Indirect contributions to maternal mortality, sometimes referred to as "upstream determinants of health," are highlighted by the known disparities in U.S. maternal mortality. Non-Hispanic Black women have 2.9 times the maternal mortality ratio of non-Hispanic white women,<sup>125</sup> with conversation often limited to suggesting institutional factors of systemic racism. Yet, in a military study that controlled for social factors such as economics and health care access, non-Hispanic Black women receiving the same health care as non-Hispanic white women were still 2.8 times as likely to be admitted to an intensive care unit and 1.7 times as likely to experience severe maternal morbidity compared to non-Hispanic white women.<sup>126</sup> There are many factors potentially contributing to maternal morbidity and mortality and these should be more fully explored as we strive to understand the disparities.

It is important to note that the outcomes of pregnancy differ among subpopulations. Spontaneous abortion (miscarriage) rates are similar among all, approximately 16%. The rates of legal induced abortion vary dramatically, however, affecting 34% of the pregnancies in non-Hispanic Black women but only 11% in white women. Abortions after the first trimester, which are more dangerous to women, are also more common in the non-Hispanic Black population, accounting for 13% of abortions among non-Hispanic Blacks compared to 9% among non-Hispanic whites. As a result of these factors, only 48% of pregnancies among the non-Hispanic Black population result in childbirth as compared to 65% of pregnancies among the non-Hispanic white population.<sup>127</sup> It is worth investigating if there are risk factors associated with abortion that may contribute to the excessive maternal mortality documented in the non-Hispanic Black population.

**Preconceptual health risk factors** impact maternal mortality. Obesity affects 47% of the non-Hispanic Black population and 47% of the Hispanic population, but only 38% of the non-Hispanic white population.<sup>128</sup> Hypertension affects 40% of the non-Hispanic Black population, but only 26% of the Hispanic population and 27% of the non-Hispanic white population.<sup>129</sup> Diabetes affects 13% of the non-Hispanic Black population and 12% of the



Hispanic population, but only 7% of the non-Hispanic white population.<sup>130</sup> An inherited thrombophilia will increase the propensity to form blood clots that block blood vessels and this occurs more commonly in the non-Hispanic Black population.<sup>131</sup> These preconceptional factors may directly predispose to mortality due to disease-related complications, and they are also associated with early delivery and increased cesarean section rates, which indirectly raise mortality risk. Chronic hypertension may lead to preeclampsia or eclampsia, which accounts for 11.4% of deaths in non-Hispanic Black women, but only 6.5% of deaths in non-Hispanic white women.<sup>132</sup>

**Poverty** is a risk factor for failure to obtain appropriate medical care and may contribute to the racial disparity noted in maternal mortality. Additionally, poverty is associated with the preconceptional health risk factors mentioned above: obesity, hypertension, and diabetes. Twenty percent of non-Hispanic Black women live in poverty compared to 16 percent of Hispanic women and 8 percent of non-Hispanic white women.<sup>133</sup> Only five percent of married couples live in poverty, so the high rates of unmarried childbirth in minority populations may be associated with poverty. Unmarried birth occurs in 67% of non-Hispanic Black women, 39% of Hispanic women, and 27% of non-Hispanic white women.<sup>134</sup> But independent of financial status, giving birth and caring for a child without a partner place a woman at an obvious disadvantage. If she should become ill, she may not seek timely emergency care due to lack of social support, childcare, or transportation.

**Location:** Where a woman lives in proximity to health care may affect her outcome in the event of a health care emergency. Many rural hospitals have closed or no longer offer obstetric services, so a woman dwelling in a “health care desert” may not find emergency care as readily as an urban woman. A 2015 analysis by Scientific American demonstrated that MMR is higher in rural areas at 29.4 deaths/100,000 live births vs. 18.2/100,000 in urban areas.<sup>135</sup> Protocols and partnerships for transport of critically ill women from low-level to higher-level hospitals are essential so life-saving care can be provided quickly in an emergency. So, too, is incentivizing training and recruitment for reproductive specialists to locate to rural areas.<sup>136</sup>

**Advanced maternal age:** There are societal pressures for women to have children at older ages due to delayed marriage, education and career prioritization, access to birth control and abortion, infertility, and other factors. The average age at first birth has increased from 21 (1970) to 27 (1990) to 30 (2019).<sup>137</sup> Advanced maternal age is associated with an increased risk of maternal death. The CDC documents that from 2003 to 2016 U.S. maternal mortality in the population 25-34 years old was 7/100,000 but this skyrocketed to 79/100,000 in the 45-54 years old group.<sup>138</sup> Assisted reproductive technology has advanced dramatically and become widespread. Physicians can perform miraculous interventions to help infertile women, but they may have difficulty saying “no” to the requests of those who have preexisting conditions that dramatically raise their risk of maternal mortality, such as morbid obesity or significantly advanced age. Reproductive



specialists should seek to prioritize preconception counseling and optimize control of medical comorbidities prior to natural or assisted conception and should carefully consider the risks vs benefits of reproductive assistance at the upper extreme of maternal age.<sup>139</sup>

**Mental health factors** may impact pregnancy outcomes. As noted above, 8.8-22.7% of maternal deaths have been attributed by MMRCs to mental health causes, but the lack of a standardized protocol to determine causality likely means that many mental health deaths exacerbated by pregnancy or its outcome are not identified as such. The maternal mental health deaths that have been identified are usually related to childbirth rather than an early pregnancy loss because, as documented throughout this discussion, an abortion-related death due to mental health complications is almost impossible to detect due to inadequacies in the system.

The association between legal induced abortion and mental health consequences is controversial, but there is no longer any dispute over the fact that abortion is associated with higher rates of mental illness. The only dispute is over when, if ever, abortion is the sole cause of subsequent mental illness.<sup>140</sup> In either case, it is intuitive that the delivery of a desired baby and the lifestyle changes that accompany that should be protective of a mother's health, whereas a pregnancy loss might be expected to have a detrimental effect on her mental health.

A 2011 meta-analysis of 22 studies found an 81% overall increased risk of mental health problems after abortion. Specifically, it found 34% increased risk of anxiety, 37% increased depression, 110% increased alcohol abuse, 230% increased marijuana abuse, and 155% increased suicidal behavior.<sup>141</sup>

A 2013 meta-analysis of all available studies, performed by a respected pro-choice researcher, concluded that there is "no credible evidence to support the research hypothesis that abortion reduces any mental health risks associated with unwanted/unplanned pregnancies that come to term".<sup>142</sup> This researcher had previously documented a 30% increase in substance abuse and anxiety after abortion in a 30-year longitudinal study which controlled for confounding variables.<sup>143</sup>

A 2016 study examining data from the U.S. National Longitudinal Study of Adolescent to Adult Health revealed that abortion is linked to a 45% higher risk of subsequent mental health problems, after controlling for prior mental health and a host of other confounding factors. A dose effect was demonstrated, with each additional abortion associated with a 23% increased risk of subsequent mental health disorders.<sup>144</sup>

Finally, a 2019 comprehensive review of the available literature revealed that two thirds (49 out of 75) of the available studies showed a positive correlation between abortion and adverse mental health outcomes.<sup>145</sup>



Additionally, the American Psychological Association has identified some sub-groups of women undergoing abortion known to be at higher risk of adverse mental health outcomes, including those who experience pressure from others to terminate, those who end a pregnancy that is meaningful due to coercion or concern for maternal or fetal health, those who lack social support, those who are ambivalent about the decision, those with a history of mental health problems, those with previous abortions, and those who have an abortion later in pregnancy.<sup>146</sup>

“Deaths of despair” are an increasing but often underrecognized cause of maternal mortality. A review of 11,782 maternal deaths in 33 states from 2010-2019 documented 11.4% were attributed to drug-related causes, 5.4% due to suicide and 5.4% due to homicide (constituting over a quarter of all deaths).<sup>147</sup> Breakdown of the family unit and single motherhood may predispose a woman to domestic violence leading to homicide.<sup>148</sup> Suicide is a leading cause of maternal death in many countries.<sup>149</sup> Numerous studies have documented that childbirth protects a woman from suicide, whereas induced or spontaneous pregnancy loss increases her risk.<sup>150</sup>

Other high risk-taking behavior, including that associated with substance abuse, may result in death from motor vehicle accidents or other accidents. These deaths could be linked to a preceding pregnancy outcome but are often excluded per protocol in the U.S.<sup>151</sup> It has been reported that 30% of Swedish maternal deaths were related to motor vehicle accidents and other accidents.<sup>152</sup> Mental health professionals counseling women struggling with pregnancy loss have documented increased risk-taking and self-destructive behaviors, which may contribute to a higher risk of accidents.<sup>153</sup>

In determination of causation, MMRCs often neglect to identify pregnancy contributions to mental health deaths unless they can document clear evidence from a mental health profile form in the prenatal records, even though they concede this likely leads to under-attribution of pregnancy events and childbearing to mental health deaths.<sup>154</sup> Comprehensive analysis necessitates that MMRCs begin investigating accidental deaths within the framework of mental health conditions and pregnancy outcomes.

**Preterm birth:** There are several potential mechanisms by which an induced abortion may increase the risk of subsequent premature deliveries. Forced dilatation of an unripe cervix may result in cervical trauma, and later cervical incompetence. Instrumental trauma of the uterus may result in faulty adherence of the placenta in subsequent pregnancies, resulting in abruption (premature separation) or placenta previa/accreta/increta (invasion of the placenta into the cervix, uterine wall, or other adjacent organs) which may require early delivery. In addition, the abortion procedure may alter the bacterial composition of the uterus, resulting in intraamniotic infection in subsequent pregnancies.<sup>155</sup>



Obstetric interventions to delay delivery in the setting of premature labor or premature rupture of membranes can increase a woman's risk of medication toxicity and infection/sepsis which can lead to maternal death. Early deliveries are more frequently performed by cesarean section due to fetal malpresentation or other complications, which increases the risk of maternal mortality. Mothers who deliver preterm are also at a higher risk of medical complications later in life, including cardiovascular disease and stroke. Prematurity is the number one cause of infant deaths as well as the cause of substantial lifelong morbidity for many children.<sup>156</sup>

The overwhelming evidence from 168 studies over 50 years demonstrates a connection between abortion and preterm birth.<sup>157</sup> One meta-analysis found that there was a 25% increased risk of premature birth in a subsequent pregnancy after one abortion, 32% after more than one, and 51% after more than two abortions.<sup>158</sup> Likewise, another meta-analysis found a 35% increased risk of delivery of a very low birthweight infant after one abortion, and 72% after two or more abortions.<sup>159</sup> Despite the widespread knowledge of an abortion-preterm birth link in the academic literature, women are often not warned by their physicians that an induced abortion could increase the risk for premature birth of subsequent children. Abortion advocates downplay this link, as demonstrated by a 2018 National Academy of Sciences, Engineering and Medicine report, which considered only five of the 168 available studies, to falsely reassure the public that there was no link between induced abortion and preterm birth.<sup>160</sup>

## PREDICTIONS

### **Maternal mortality predictions as state-level abortion restrictions are enacted:**

In the politically polarized climate following the Supreme Court's decision in *Dobbs v. Jackson Women's Health*, reversing *Roe v. Wade*, and allowing legislatures to regulate abortion, allegations have arisen that this action will increase maternal mortality. One researcher even went so far as to predict that a total abortion ban in the U.S. would result in a 7% increase in pregnancy-related deaths in the first year and 21% increases yearly thereafter.<sup>161</sup> Fortunately, there are many reasons to expect abortion restrictions to decrease, rather than increase, maternal mortality.

**Abortion restrictions will not prohibit medical interventions for life-threatening emergencies** because all states have exemptions in their pro-life laws to save the life of the mother if her pregnancy poses a risk to her life.<sup>162</sup> The necessity for an abortion in this situation is extremely rare, however, because usually these heartbreaking situations do not occur until the second half of pregnancy, when a woman's obstetrician can deliver her in a safer, medically standard way, by induction or cesarean section, and often the baby's life can be saved also. An entire subspecialty of obstetrics — maternal-fetal medicine — exists to help high-risk women and their children make it safely through





pregnancy and delivery. In the rare event that a dilation and evacuation is the only or best option, however, all states will allow this intervention.

Health care providers ranging from the American Association of Pro-Life Obstetricians and Gynecologists to Planned Parenthood have all acknowledged that treatment of an ectopic pregnancy is not the same as abortion and all states will allow treatment of this life-threatening condition.<sup>163</sup>

Management of miscarriages is also not affected by legislation restricting elective abortion. Although the treatment of a deceased fetus can be similar to procedures used to induce abortion, there is a clear difference in the intent of actively ending fetal life versus caring for a woman once that life has ended. It is extraordinarily rare for a life-threatening miscarriage event to occur while a fetus is still alive, but if it does the provider can provide the necessary treatment under the exemption for life-saving treatment.<sup>164</sup>

As previously noted, the population most impacted by maternal mortality, non-Hispanic Black women, has abortion rates that mirror their maternal mortality. High maternal mortality and high abortion rates shouldn't coexist if abortion reduces maternal mortality. Clearly abortion is not protecting non-Hispanic Black women from maternal mortality and may be increasing their risk. The following are reasons that allowing fewer abortions will lower the risk of maternal mortality:

**Abortion restrictions will limit dangerous, later abortions.** Approximately 8-10% of U.S. abortions occur after the first trimester and 1% occur in the second half of pregnancy (after viability when the baby can survive separated from his mother). Non-Hispanic Black women have a higher percentage of later abortions (13%) than non-Hispanic white women (9%), raising their risk of death from the procedure.<sup>165</sup> These abortions are usually performed by dilatation and evacuation (D&E), which is much more dangerous than earlier abortion procedures, as it requires forcibly dilating a strong muscular cervix and multiple blind passes of surgical instruments to disarticulate the fetus and remove the pregnancy tissue, with risks of hemorrhage, infection, retained tissue, damage to adjacent organs, anesthetic complications and stroke, heart attacks and deaths, if severe. Even though the CDC's data on maternal mortality is known to be incomplete, the available data documents that a woman's risk of death from abortion increases dramatically as the pregnancy progresses.<sup>166</sup>

**Abortion restrictions will reduce the incidence of repeat abortions.** As previously mentioned, abortion is associated with an increase in all-cause mortality rates, especially when women are exposed to multiple abortions.<sup>167</sup> To the degree abortion restrictions contribute to a reduction in exposure to multiple abortions, this should reduce the overall mortality rate of women of reproductive age.





**Abortion restrictions will prevent some future pregnancy complications.**

Abortion can predispose to future pregnancy complications, although there is no way to document this causality with our current poor documentation systems. For example, surgical trauma to the uterine lining in a dilation and suction, curettage or evacuation procedure may cause an abnormal placental attachment in the next pregnancy. Placental abruption (premature separation) can occur if the attachment is not secure, and placental accreta syndrome (pathologic invasion) can occur if the attachment is too strong. Both of these abnormal placental attachments can lead to life-threatening bleeding at delivery. Also, abortion has been documented to increase the risk of a subsequent preterm birth which is associated with higher maternal mortality.<sup>168</sup> Limiting abortion will decrease women's risk of maternal mortality in subsequent pregnancies for these reasons.

**Abortion restrictions will prevent future mental health disorders in some women.** Abortion is linked to mental health disorders such as anxiety, depression, substance abuse or overdose, excessive risk-taking behavior, self-harm and suicide, all of which can contribute to maternal mortality.<sup>169</sup> Unfortunately, our inadequate maternal mortality reporting system often does not detect these "deaths of despair" related to abortion, but as previously documented, such deaths undoubtedly occur. Conversely, delivery of a new baby often leads a woman to reduce her risk of accidents by staying at home to care for her new child.

**Abortion restrictions may lead to more fathers taking responsibility** for their children and decrease the rates of single motherhood. Abortion has devastated the family structure and social relationships in our country. The narrative that reproduction is a "woman's choice" has led many men to be absent fathers if a woman chooses to give birth to her child. This increases the odds that she lives in poverty as a single mother, which is associated with medical conditions such as obesity, hypertension, diabetes, and lack of insurance. Without a supportive partner or other family support to encourage her to seek help in a medical emergency, access to transportation, or childcare for other children, she may delay life-saving medical care until it is too late. It is beyond the scope of this discussion, but absent fathers have also been documented to contribute to many other societal ills.<sup>170</sup>

**Abortion restrictions will encourage more women to give birth and are unlikely to result in illegal septic abortions.** The frightening and erroneous narrative that a woman denied abortion will seek it in an unsafe way, resulting in 5,000-10,000 deaths yearly, drove its widespread legalization in 1973, and is being recycled today as states pose restrictions.<sup>171</sup> Yet, in the years prior to *Roe v. Wade*, the CDC documented fewer than 100 deaths yearly from both legal and illegal abortions.<sup>172</sup> Abortion had been becoming safer long before it was legalized due to improved surgical techniques, safer anesthesia, and widespread antibiotic use. Even then, 90% of abortions were performed by physicians, albeit illegally.<sup>173</sup> Today, abortion advocates are aggressively promoting unsupervised chemical abortion to women in states with restrictions. Although more likely



to result in complications than surgical abortion, only 28 deaths have been attributed to chemical abortion in the U.S. since 2000, so it is unlikely that restrictions will contribute to excessive maternal deaths. Besides, the most likely outcome for a woman who encounters obstacles to abortion is that she will carry her pregnancy to term and grow to love her child.

**Abortion restrictions may encourage both men and women to change their sexual behavior.** Studies of changes in abortion laws, both in the U.S. and internationally, show that with moderate limitations on abortion, the abortion rate goes down, while the birth rate stays the same. With tighter restrictions, such as a complete ban, this may temporarily increase the birth rate by a small amount, but this stabilizes over time. As the “cost” of abortion rises, men and women often modify their behavior by decreasing promiscuous sexual activity and increasing use of more effective contraception.<sup>174</sup>

**Abortion restrictions may reduce the number of unwanted abortions.** As many as 64% of women with a history of abortion report feeling pressured into their abortions by other people, such as their male partner or parents.<sup>175</sup> Since “perceived pressure from others” to have an abortion is one of the risk factors for mental health problems after abortion that has been identified by the APA, it is reasonable to hope that abortion restrictions, especially those requiring abortion providers to screen for mental health risk factors, will reduce the rate of

abortion in women at greatest risk of negative psychological reactions. This will reduce the rate of suicide and self-destructive behaviors that have been observed among women exposed to unwanted or coerced abortions.

**Abortion restrictions in other countries have not been shown to increase maternal mortality.** Examination of international trends demonstrates that maternal mortality does not increase after abortion restrictions are adopted. Chile, which had legal abortion from 1957-1988 and prohibited abortion from 1989-2007, found that maternal mortality declined despite the change in legal status of abortion as education and obstetrical care improved.<sup>176</sup> Similarly, Mexican data showed the 32 states that permitted abortion had a 30% higher maternal mortality ratio and 89% higher abortion mortality rate than states with restrictive abortion laws.<sup>177</sup> Likewise, comparing demographically similar countries of the Republic of Ireland and the United Kingdom with disparate abortion laws,<sup>178</sup> restrictive Ireland demonstrated a lower maternal mortality rate<sup>179</sup> than in the permissive UK.<sup>180</sup> El Salvador, Poland, and Nicaragua, which all enacted abortion restrictions, have seen their maternal mortality improve afterwards. South Africa, on the other hand, has seen maternal mortality worsen after the legalization of abortion.<sup>181</sup>



Due to political polarization in the U.S., some have implicated conservative southern states with elevated maternal mortality ratios, implying that policy recommendations and abortion restrictions are to blame. A comparison is in order: Mississippi, which restricts abortion, has one of the highest MMRs at 35.2/100,000 live births. However, some urban centers managed by progressive politicians with permissive abortion laws have similar ratios: Baltimore 35.2/100,000, Bronx County, NY 40.1/100,000, New York County, NY 25.8/100,000. Since these populations have similarly poor maternal mortality but don't share abortion restrictions, one must ask what they do have in common that may contribute to poor maternal outcomes. The answer, of course, is poverty. In Mississippi, 18.7% of the population lives in poverty, Baltimore City 20%, Bronx County 24.4%, and New York County 16.3%.<sup>182</sup>

Throwing more money at the problem is unlikely to be the solution if we fail to address the root causes of poverty and other maternal factors discussed above. While the U.S. spends \$10,103 per person per year on health care, one of the poorest countries in Europe, Moldova, spends \$244.<sup>183</sup> Yet, in 2017, they had the same maternal mortality ratio of 19/100,000 live births.<sup>184</sup> In fact, the U.S. has the worst maternal mortality ratio compared to other developed countries while simultaneously documenting one of the highest abortion rates, particularly those performed later in pregnancy.<sup>185</sup>

## CONCLUSION

The issue of maternal mortality deserves rigorous discourse. America's maternal mortality rate is the worst in the developed world, calling for careful discernment of the underlying factors, driven by a genuine concern for the wellbeing of women and their children. Instead, politics and ideological rhetoric shroud the conversation. Full and open dialogue requires transparent data, beginning with the documentation of all pregnancy events, all complications, and all maternal deaths. Efforts to address maternal mortality will continue to be hindered until complete data allows us to understand the breadth of the issue and begin to untangle its underlying causes. The demand for accurate maternal mortality data is one of common sense and should draw bipartisan support.

It is crucial to increase awareness that maternal mortality can follow *any* pregnancy event—including induced abortion—and that these tragic deaths often occur outside of the healthcare system and temporally separated from the end of pregnancy. Acknowledging the wide range of causes behind maternal mortality compels a wide range of approaches in ameliorating their effects. The detection of adverse events in early pregnancy must be expanded, particularly when related to legal induced abortion. Mental health disorders must be thoroughly investigated, and diligence applied to determining how a pregnancy event may have contributed to a “death of despair.” These are not “quick fixes” and will require work beyond current efforts to improve medical intervention in hospitals for



obstetric emergencies. While emergency intervention at the time of delivery is an important place to start, the issue of maternal mortality spans far beyond a hospital room. In boldness and unfettered by ideological pressure, our care for mothers must reach beyond the hospital room too.

## RECOMMENDATIONS

### **Policy recommendations to improve data accuracy and protect women from maternal deaths:**

#### **United States Department of Health and Human Services:**

- Mandate reporting of all pregnancy outcomes (term and preterm live births and stillbirths, legal induced abortions, ectopic pregnancies, gestational trophoblastic disease and miscarriages) by local providers, collected by state health departments, and then relayed to the CDC. Do not permit a reporting exemption for induced abortion fetal deaths after 20 weeks as is currently allowed.
- Standardize reporting forms to be consistent in all reporting areas. Ideally this would be in the form of “fetal loss certificates” throughout an entire pregnancy much as live births and stillbirths after 20 weeks are currently documented on birth certificates. To allay privacy concerns, all the same privacy protection mechanisms used in other medical reports filed with state health officials (such as with cancer registries, venereal disease reports, birth defect registries) should apply to protect personal identifying information.
- Mandate reporting of all complications and deaths associated within a year of any pregnancy outcome to state health departments, with special emphasis on reporting of complications that occur outside of the standard medical system (hospitals usually have comprehensive reporting systems but abortion and private gynecologic clinics often do not). Be aware that severe maternal morbidity is closely related to maternal mortality and accurate reporting of “near-miss” events should also be prioritized and mandated. Enforce strict noncompliance penalties for failure to report or misrepresentation of events (for example, induced abortion complications intentionally misreported as resulting from a miscarriage).
- Enforce these mandatory reports by linking requirements to federal CMS reimbursement, with monetary penalties for withholding data. Do not allow states to refuse to report abortions or abortion-associated deaths for ideologic reasons as California, Maryland and New Hampshire do currently.

#### **States' Departments of Health:**

- Link reproductive age women's death certificates, birth certificates, and fetal loss certificates (at all gestational ages in pregnancy) to publish a report each year tabulating the total number of pregnancy-associated deaths for each pregnancy



outcome within 42 days and within one year of the deceased woman's most recent pregnancy.

- Streamline and standardize the death certification electronic medical records system.
- Create an easy-to-use electronic reporting form for “near-miss” pregnancy complications that do not result in death and ensure that doctors are aware that it is available and encouraged to report.
- Make tutorials readily available for physicians to ensure accurate use of death and complication reporting forms, engaging state medical societies to assist with dissemination of this information.
- Provide the reporting forms in a timely fashion and make submission as simple as possible through direct electronic transmission.

**Hospital Associations, Joint Commission on Accreditation of Healthcare Organizations, State Medical and Pharmacy Boards:**

- Educate physicians on accurate reporting of pregnancy outcomes and complications with specific recommendations on how this should be done through email blasts, required CME, residency training requirements, etc.
- Provide oversight on complication trends related to the various ends of pregnancy and require the same standards of care from abortion providers as from all other health care providers.
- When states implement new legal induced abortion restrictions, state medical boards should engage with legal counsel, and state attorneys general to provide interpretation of the new legislation to health care providers to minimize confusion and misinterpretation of the laws. Hospital systems should create medical oversight quality committees that provide advanced guidance and can also be convened rapidly to facilitate decisions on emergency care in situations where medical compliance with state law may be unclear. Similarly, state boards of pharmacy should give guidance regarding protocols and medical oversight of potentially teratogenic and embryocidal medications, such as methotrexate and misoprostol.
- All hospitals should utilize maternal safety toolkits to assess risk and provide preventative treatment for hypertensive disorders, sepsis, thromboembolism and hemorrhage and hospitals should require frequent emergency drills to train staff to more effectively manage emergent situations.
- Improve rural healthcare by creating algorithms for care and transfer from low-level rural hospitals to higher-level hospitals for complex cases. Provide community education notifying residents of facilities where obstetric care is available. Prioritize and incentivize recruiting and retention of rural physicians and support of vulnerable rural hospitals.



- Develop new primary care and ob/gyn community residency programs in rural areas. Currently, only 93% of allopathic medical students and 90% of osteopathic medical students obtain their desired residency opportunity after medical school graduation. While we bemoan a shortage of rural physicians, resulting in “health care deserts,” Congress has failed to allocate additional residency funding in over 30 years. Prioritizing funding to train ethical healthcare providers who desire to provide primary and obstetric care in underserved areas will improve outcomes in those areas and optimize the investment we have made in training physicians.

**ICD-10 Coding Registry:**

- Expand induced abortion complication and death causes coding to account for all possible complications following abortion that may result in maternal death and optimize search engine discovery.

**Reproductive Health Specialists:**

- Reproductive specialists should optimize health of women prior to assisting them in attaining pregnancy. Primary care physicians and ob/gyns should prioritize discussion of pregnancy intent, with effective family planning options offered if pregnancy not desired; and if pregnancy is desired, pre-pregnancy optimization of high-risk medical conditions.
- Attention should be directed to improving obstetric management of high-risk pregnant women with advanced age, obesity, diabetes, hypertension, thrombophilia, cardiac disease, congenital cardiac disorders and/or prior poor pregnancy outcomes, as well as managing new onset pregnancy complications such as multiple gestation, gestational diabetes, pregnancy-induced hypertension and thromboembolism.
- Women should be counseled regarding the increased risks associated with induced abortion on reproductive and mental health and with childbirth at more advanced ages.

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